Dianne L. Anderson, Ph.D.

Biology Department, Point Loma Nazarene University 619.849.2705
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Professional experience:

2005 - present Professor, Biology Department
Director, MS graduate program in General Biology
Point Loma Nazarene University, San Diego, CA

1991 - 2005 Professor, Biology Department
Department chair (January 1997 – June 1998)
San Diego City College, San Diego, CA

Education:

2003 Ph.D. Math and Science Education
University of California, San Diego & San Diego State University, San Diego, CA

1989 M.S. Microbiology
San Diego State University, San Diego, CA

1985 B.S. Biology (magna cum laude)
Northwest Nazarene College, Nampa, ID

Courses taught in current position:

Undergraduate: Human Biology & Bioethics
Organismal Biology
Applied Plant Biology
Senior Seminar (for biology majors)

Graduate: History & Philosophy of Science
Physiology of Plants & Animals (plant portion)
Research Proposal and Pilot Study

Attendance at and participation in invitation-only working conferences:

Vision & Change in Undergraduate Biology Education funded by NSF, HHMI, USDA, and AAAS (Washington, D.C., August 28-30, 2013)
Evolution Education Assessment workshop (Orlando, FL, April 2011)
Conceptual Assessment in Biology III funded by NSF (San Diego, CA, May 2010)
Conceptual Assessment in Biology II funded by NSF (Monterrey, CA, May 2008)

Publications:

Anderson, D.L., Fisher, K.M. & Smith, M.U. (2010). Support for the CINS as a diagnostic conceptual inventory: Response to Nehm and Schonfeld (2008). Journal of Research in Science Teaching, 47(3), 354-357.

Anderson, D.L., Fisher, K.M., & Norman, G.J. (2002). Development and evaluation of the Conceptual Inventory of Natural Selection. Journal of Research in Science Teaching, 39, 953-978. (cited 481 times as of 5-10-17)

Anderson, D.L. & Tsoukas, C.D. (1989) Cholera toxin inhibits resting human T-cell activation via a cAMP- independent pathway. Journal of Immunology, 143(11), 3647-3652.

Unpublished documents:

Anderson, D.L. (2003). Natural selection theory in non-majors biology: Instruction, assessment and conceptual difficulty. Unpublished Dissertation, University of California, San Diego Library, San Diego, CA

Anderson, D.L. (1989). Cholera toxin inhibits resting human T-cell activation via a cAMP-independent pathway. Unpublished Master's thesis, San Diego State University Library, San Diego, CA

Webinar:

Anderson, D. (May 14, 2010). Using the Conceptual Inventory of Natural Selection. Fifth in the 2010 Webinar series offered by the American Institute of Biological Sciences, University of California Museum of Paleontology, National Association of Biology Teachers, and the Introductory Biology Project

Commissioned work:

Development and field testing of ten biology concept cartoons for the HHMI Biointeractive website (Summer 2021-Summer 2022)

Conference Papers with Presentations:

Nasont, M. & Anderson, D.L. (April 2017). Integrating assessment with teaching: Pairing biology concept cartoons with the CINS to teach and assess natural selection. Paper presented at annual meeting of the National Association for Research in Science Teaching (NARST) 2017, San Antonio, TX, April 22-25, 2017. (peer-reviewed proposal)

Korb, M., Anderson, D.L., Hagedorn, E., Jensen, M. & Silberglitt, M. (April 2013). A life science concept inventory on genetics/ molecular biology for middle school learners: Assessment development informs teacher pedagogy. Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA. (peer-reviewed proposal)

Evans, P. & Anderson, D.L. (April 2013). The Conceptual Inventory of Natural Selection a decade later: Development and pilot testing of a middle school version leads to a revised college/high school version. Paper presented at annual meeting of the National Association for Research in Science Teaching (NARST) 2013, Rio Grande, Puerto Rico, April 6-9, 2013. (peer-reviewed proposal)

Williams, K.S., Fisher, K.F., Anderson, D.L., Smith, M.U., & Lineback, J.E. (2008). Using diagnostic test items to assess conceptual understanding of basic biology ideas: A plan for programmatic assessment. Paper presented at Conceptual Assessment in Biology II, Monterrey, CA, May 2008.

Presentations/Workshops at conferences:

Anderson, D.L. (Oct. 25, 2019). “I feel like a scientist”: Collecting and analyzing data at various grade levels. Presented at the annual Science Faith Alliance Professional Development Day for Science Teachers, San Diego, CA.

Anderson, D.L. (Aug. 3, 2018). Development of the health sciences version of the Conceptual Inventory of Natural Selection. Presented at the annual International Society for Evolutionary Medicine and Public Health conference, Park City, Utah.

Anderson, D.L. (April 2017). Biology concept cartoons as a formative assessment tool. Presented at the annual San Diego Science Education Association (SDSEA) conference, El Cajon, CA.

Anderson, D.L. (November 2016). Genetically Modified Organisms. Presented at the annual Science Faith Alliance Professional Development Day for Science Teachers, San Diego, CA.

Anderson, D.L. (November 2015). Using Card Sorts to Learn Science. Presented at the annual Science Faith Alliance Professional Development Day for Christian School Science Teachers, San Diego, CA.

Anderson, D.L. (November 2014). Alternatives to a Science Fair. Presented the annual Science Faith Alliance Professional Development Day for Christian School Science Teachers, San Diego, CA.

Anderson, D.L. (December 2014), Engaging ways to teach and assess understanding of natural selection: Concept cartoons and the Conceptual Inventory of Natural Selection. Presented at the annual meeting of the California Science Teachers’ Association, Long Beach, CA. (peer-reviewed proposal)

Anderson, D.L. (December 2013). Science Pedagogy: Helping students design their own experiments. Presented at the annual Science Faith Alliance Professional Development Day for Christian School Science Teachers, San Diego, CA.

Anderson, D.L. (October 2011). How well do your students really understand natural selection? Presented at the annual meeting of the California Science Teachers’ Association, Pasadena, CA. (peer-reviewed proposal)

Anderson, D.L. (October 2011). Biology concept cartoons can engage ALL of your students. Presented at the annual meeting of the National Association of Biology Teachers, Anaheim, CA. (peer-reviewed proposal)

Anderson, D.L. (November 2011). Biology concept cartoons can engage ALL of your students. Presented at the annual meeting of the San Diego Science Educator’s Association, San Marcos, CA. (peer-reviewed proposal)

Maskiewicz, A. & Anderson, D.L. (October 2009). Get your students thinking and talking about biology. Presented at the annual meeting of the California Science Teachers’ Association, Palm Springs, CA. (peer-reviewed proposal)

Anderson, D.L., Hedgecock, M. & Rall, M.A. (October 2008). New biology cartoons based on alternative conception research. Presented at the annual meeting of the California Science Teachers' Association, San Jose, CA. (peer-reviewed proposal)

Anderson, D.L. & Tenenbaum, R. (October 2008). Analogies in biology: wolves in sheep's clothing or great tools? Presented at the annual meeting of the California Science Teachers' Association, San Jose, CA. (peer-reviewed proposal)

Williams, K. S., Fisher, K. M., Anderson, D. L., Smith, M. U., & Lineback, J. E. (2008). Using diagnostic test items to assess conceptual understanding of basic biology ideas: A plan for programmatic assessment. Presented at *Conceptual Assessment in Biology II* conference.

Fisher, K. M., Williams, K. S., & Anderson, D. (August 2007). Developing and evaluating the Conceptual Inventory of Natural Selection. Presented at the annual meeting of the Ecological Society of America, San Jose, CA.

Anderson, D.L. (October 2006) Biology diagrams: Teaching, learning and understanding. Presented at the annual meeting of the California Science Teachers' Association, San Francisco, CA. (peer-reviewed proposal)

Williams, K.S., Fisher, K. & D. Anderson. (2005). Developing a diagnostic exam for general biology. Paper presented in Symposium, "Pathways to scientific teaching in ecology education," at the Ecological Society of America 90th Annual Meeting and IX International Congress of Ecology, Montreal, Canada Aug 2005. Published in *Abstracts of Ecological Society of America,* 90th Annual Meeting, p.694.

Anderson, D.L. (October 2005). Promoting conceptual understanding of natural selection using activities to teach ecology and genetics ideas. Presented at the annual meeting of the California Science Teachers' Association, Palm Springs, CA. (peer-reviewed proposal)

Anderson, D.L. & Fisher, K.M. (March 2003). Conceptual Inventory of Natural Selection: A useful classroom tool with instructional implications. Presented at the annual meeting of the National Association for Research in Science Teaching, Philadelphia, PA. (peer-reviewed proposal)

Anderson, D.L. & Fisher, K.M. (March 2002). Biology concept cartoons: A constructivist tool for dealing with alternative conceptions. Presented at the annual meeting of the National Science Teachers' Association, San Diego, CA. (peer-reviewed proposal)

Fisher, K., Anderson, D., Becvar, L., Noland, C., Anderson, A., Sandifer, C., & Goessling, C. (May 2000). Evolution as an experimental science: Implications for developing and assessing students' conceptions. Presented at the annual meeting of the National Association for Research in Science Teaching, New Orleans, LA. (peer-reviewed proposal)

Master's theses directed:

Barnett, Ashley (2016). Use of biology concept cartoons as a tool to address alternative conceptions in the secondary classroom. Master's thesis, Point Loma Nazarene University, San Diego, CA.

Nasont, Matthew (2016). Comparison of massed versus distributed use of concept cartoons in a secondary biology classroom. Master's thesis, Point Loma Nazarene University, San Diego, CA.

Pimetal Spahr, Jessica (2014). High school students' conceptual understanding of natural selection, specifically variation in a population and origin of variation, as influenced by traditional concept cartoons, or an animated software program. Master's thesis, Point Loma Nazarene University, San Diego, CA.

Reed, Marilyn (2014). Use of inquiry based-pedagogy during organism dissection to improve scientific questioning skills of middle school students. Master's thesis, Point Loma Nazarene University, San Diego, CA.

Vogel, Casey (2013). Scaling ability and atom and cell conceptions and their implications for understanding cellular functions by middle school students. Master's thesis, Point Loma Nazarene University, San Diego, CA.

Evans, Patricia (2013). A Revision of the Conceptual Inventory of Natural Selection for middle school students. Master's thesis, Point Loma Nazarene University, San Diego, CA.

Porter, Christy (2011). Use of biology concept cartoons to promote discussion of mitosis and meiosis among high school biology students: A qualitative study. Master's thesis, Point Loma Nazarene University, San Diego, CA.

Gross, Muriel (2011). Use of biology concept cartoons to assist low performing middle school students in their understanding of natural selection. Master's thesis, Point Loma Nazarene University, San Diego, CA.

Dwyer, Danielle (2011). Using interview data from non-major biology students to improve the Conceptual Inventory of Natural Selection. Master's Thesis, Point Loma Nazarene University, San Diego, CA.

Broemmelsiek, Jocelyn (2010). The effects of application-based inquiry curriculum on students' understanding of the nature of science. Master's Thesis, Point Loma Nazarene University, San Diego, CA.

Hermosillo, Nina (2010). The validity of a two-tiered diagnostic assessment for identifying college students' ideas about meiosis and mitosis. Master's Thesis, Point Loma Nazarene University, San Diego, CA.

Rall, Michael (2009). Design and use of conceptual cartoons as tools for conceptual change in high school biology classes. Master's Thesis, Point Loma Nazarene University, San Diego, CA.

Estes, Sarah (2008). Evidence for natural selection conceptions present in upper division biology majors. Master's Thesis, Point Loma Nazarene University, San Diego, CA.

Plagge, Anita (2008). The relationship between college students' biology knowledge and support of stem cell research. Master's Thesis, Point Loma Nazarene University, San Diego, CA.

Rall, Mary Ann (2008). Using concept cartoons and the Conceptual Inventory of Natural Selection to evaluate the progression of students' understanding of natural selection. Master's Thesis, Point Loma Nazarene University, San Diego, CA.

Awards and Grants

Point Loma Nazarene University RASP grant (Spring 2017). Identification and labeling of plants on campus.

Point Loma Nazarene University Alumni grant (Spring 2012). Production of research-based biology concept cartoons on the topics of cell division, natural selection, and ecology for use by middle and high school teachers.

Professional Associations:

National Association of Biology Teachers (member)

University service:

Faculty Development Committee (2013-2017)

- Served as chair of the committee from Fall 2014 through Spring 2016 when the committee was revising the entire faculty teaching evaluation process, as well as all of the related forms.
- Organized and led (or co-led) several trainings for faculty members who were willing to serve as Trained Peer Evaluators.

Teacher Education Committee (2010 to present)
Study Abroad Advisory Committee (2016-2020)
Graduate Studies Committee (2006 -2012)
Faculty representative to Board of Trustees (2019-2022)
Faculty Governance Committee (2020-present)

Professional service:

Science Faith Alliance

- Board member (2010-2021)
- Member of organizing committee for Professional Development Day for Science Teachers at Christian Schools in 2013, 2014, 2015, 2016, 2017, and 2019 in San Diego.

Member of organizing committee and host for the international Conceptual Assessments in Biology Meeting (CAB III) in May 2010 at Point Loma Nazarene University

Manuscript reviewer for the following journals:
Bioscience
CBE – Life Sciences Education
International Journal of Science Education
Journal of Research in Science Teaching

Community service:

San Diego First Church of the Nazarene
Church member (2000-present)
Board member (2015-2019, 2022-present)